

Poster Abstracts

P1: Whiria te tangata with Dynamic Seating - A case Study

Ms Victoria Cotton

Northland DHB, Whangarei, New Zealand

Physiotherapist/Wheelchair Therapist

Learning objectives

1. Name 3 Seating Dynamic Accessories that may increase tolerance in sitting
2. Describe 2 modifications to allow change of force in dynamic seating
3. Identify 3 different seating components to assist with positioning

Abstract

This is a case study poster presentation of a young man(age 21) using complex seating and wheelchair with Dynamic components to assist with management of tone and movements. The client has had numerous complex surgeries and many wheelchair and seating interventions over the years. I have been his therapist for approx. 20 years.

He is very keen to share the latest model with you as many others may benefit from his journey .

We ,the client, whanau and members of Wheelchair Services, have grown together overcoming many challenges not to mention our ages, technology and life experiences The case study has a WhOM outcome measure.

Content references

- 1) Resna - Position Statements on Dynamic Seating
- 2) Let's get moving ! Providing movement within a wheelchair . Michelle L Lange. e ParentConnect ,Featured Topics, Mobility05/25/2018 admin.
- 3) Seating Dynamics -Revolutionizing the Dynamic Footrest Marc Hagen .Closing the Gap March 17,2021

Presenter biography

Victoria Cotton is a physiotherapist originally from UK -qualified in UK. She worked for many years in the Middle East and New Zealand as Wheelchair and Seating therapist in Northland for Te Poari Hauora a Rohe o Te Tai Tokerau (NorthlandDHB)

We travel around Te Tai Tokerau supporting clients and Whanau which has many Health and Service inequalities.

P2: “He Took Off...Fast!”: A Photo Narrative of Modified Ride-On Car Use by Children and Families

Ms. Reham Abuatig, Dr. Heather Feldner
University of Washington, Seattle, USA
Reham Abatig, PhD Student
Dr Heather Feldner, Assistant Professor

Learning objectives

After this poster session, participants will be able to:

1. Identify the role of photovoice narratives as a participatory action research method applied to the field of pediatric positioning and mobility.
2. Understand at least three perceived facilitators and barriers of modified ride-on car access and use by children with CP or developmental delay and their families.
3. Discuss how the visual impact and narration of child and family technology experiences can be leveraged to improve products and processes related to mobility equipment.

Abstract

Powered mobility devices (PMDs) can increase independent mobility and enhance function and participation in children with disabilities. Over the past decade, modified ride-on cars have emerged as one alternative early powered mobility option for young children with disabilities such as cerebral palsy (CP) or developmental delay.

Although popularity of modified ride-on cars has been growing, little is known from families’ own point of view about their perceived mobility priorities and experiences with the cars over a longitudinal period. We aimed to empower families of children with CP or developmental delay to share their mobility stories and experiences with modified ride-on cars using their own words and pictures, via a participatory research technique known as Photovoice Narrative. During an overarching longitudinal study with 19 families, where children between the ages of one and four years old and their caregivers were provided with a custom modified ride-on car for home and community exploration, mobility, and socialization, a subset of 14 families completed this participatory study as co-researchers. Each caregiver was given a digital research camera with a blank memory card and a list of guiding questions, but had the freedom to take photos of anything they felt was meaningful or important related to their child’s modified ride-on car use. Participants then selected their favorite or most meaningful photos, and provided brief narrations. Narrations which were transcribed verbatim and grouped into themes alongside the photos using constant comparison. Three preliminary themes emerged from the data: 1) *My Child CAN...* 2) *Mobility Begets Agency and Community Building*; and 3) *Technology Challenges and Barriers Remain*. This study demonstrates that Photovoice Narratives are an accessible and visually compelling way to understand how modified ride-on cars may fit or misfit in the lives of children with disabilities and their families.

Content references

- 1) Burke, J. (2012). ‘Some kids climb up; some kids climb down’: culturally constructed play-worlds of children with impairments. *Disability & Society*, 27(7), 965-981.

- 2) Carver, J., Ganus, A., Ivey, J. M., Plummer, T., & Eubank, A. (2016). The impact of mobility assistive technology devices on participation for individuals with disabilities. *Disability and Rehabilitation: Assistive Technology, 11*(6), 468-477.
- 3) Chiarello, L. A., Palisano, R. J., Maggs, J. M., Orlin, M. N., Almasri, N., Kang, L. J., & Chang, H. J. (2010). Family priorities for activity and participation of children and youth with cerebral palsy. *Physical therapy, 90*(9), 1254-1264.
- 4) Dockett, S., Einarsdottir, J., & Perry, B. (2017). Photo elicitation: Reflecting on multiple sites of meaning. *International Journal of Early Years Education, 25*(3), 225-240.
- 5) Feldner, H. A., Logan, S. W., & Galloway, J. C. (2019). Mobility in pictures: a participatory photovoice narrative study exploring powered mobility provision for children and families. *Disability and Rehabilitation: Assistive Technology, 14*(3), 301-311.
- 6) Palisano, R. J., Shimmell, L. J., Stewart, D., Lawless, J. J., Rosenbaum, P. L., & Russell, D. J. (2009). Mobility experiences of adolescents with cerebral palsy. *Physical & occupational therapy in pediatrics, 29*(2), 133-153.
- 7) Sutton-Brown, C. A. (2014). Photovoice: A methodological guide. *Photography and Culture, 7*(2), 169-185.
- 8) Rodger, S., Jackson, D., Vines, J., McLaughlin, J., & Wright, P. (2019, May). JourneyCam: Exploring experiences of accessibility and mobility among powered wheelchair users through video and data. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-15).
- 9) Taherian, S., & Davies, C. (2018). Multiple stakeholder perceptions of assistive technology for individuals with cerebral palsy in New Zealand. *Disability and Rehabilitation: Assistive Technology, 13*(7), 648-657.

Presenter biography

Ms. Reham Abuatiq is a pediatric physical therapist and second-year PhD student in the Rehabilitation Sciences Program at the University of Washington in Seattle, WA, USA. Originally from Amman, Jordan, Reham holds a Bachelor's Degree in Physical Therapy and a Master's in Health Services Management from Yarmouk University and the Royal College of Surgeons in Ireland. She has extensive experience in training physical therapy students in public hospitals, outpatient rehabilitation clinics, and special education schools, and worked as a clinician at Al-Hussein Society for Physically Disabled Children with children with cerebral palsy, spina bifida, Duchenne Muscular Dystrophy, and Down syndrome. Her research interests include advancing access to physical therapy services for children in Jordan, improving equity for children with disabilities in school and community settings, and supporting the transition from adolescence to adulthood in young people with cerebral palsy.

Dr. Heather Feldner is an Assistant Professor in the Department of Rehabilitation Medicine, core faculty in the Disability Studies Program, and an Associate Director of the Center for Research and Education on Accessible Technology and Experiences (CREATE) at the University of Washington in sunny Seattle, WA, USA. Her research is centered at the intersection of mobility, disability, and technology in two primary areas: Perceptions of disability and identity and how these emerge and evolve through technology use in children and adults with disabilities; and in the design and implementation of pediatric mobility technology, considering how attitudes and the built environment affect equity, participation, and device use. Her current work incorporates multidisciplinary, mixed methods, and participatory approaches drawing from her background as a pediatric physical therapist, doctoral work in disability studies, and postdoctoral research in user-centered rehabilitation and design in mechanical engineering.

P3: Trends in complex wheelchair and seating equipment provision in Tāmaki Makaurau, Aotearoa

Maria Whitcombe-Shingler

ADHB, Auckland, New Zealand, Educator

Learning objectives

1. To consider the trends in complex wheelchair and seating provision over the last decade.
2. Increase awareness of a holistic approach to wheelchair and seating assessment and equipment provision that considers the social, environmental and lifestyle needs of the individual alongside their clinical requirements, using the principle of Whanaungatanga, connecting.
3. Consider use of clinical data as the basis for improving outcomes and use of resources.

Abstract

Auditable data is increasingly available and accessible from digitised clinical records, to inform clinicians of overall practice trends in complex wheelchair and seating equipment provision, as opposed to anecdotal evidence. It gives useful feedback on client demographics and equipment used that can help inform equity and effectiveness. *‘He mauri tō te tangata, he whakapapa tōna, he mana motuhake’* Everyone has mana and identity that makes that person no more and no less important than the next person.

Mobility Solutions is based in Tāmaki Makaurau, Auckland, a large metropolitan city in the [North Island](#) of Aotearoa, [New Zealand](#). It is the [most populous urban area](#) in the country, and has an urban and rural population of about 1,717,500 (June 2020). Data is analysed to demonstrate practice changes and outcomes within the service in the last decade, and the importance of enabling and increasing social connection through effective mobility and positioning. *‘Me hui kanohi ki te kanohi kia rongō i te mauri o te tangata!’* It is important to meet face to face, eye to eye, breath to breath to get a full understanding of the people we are working with.

Content references

- 1) Bray et al. (2014). Wheelchair interventions, services and provision for disabled children: a mixed-method systematic review and conceptual framework. BMC Health Services Research, 14:309 Retrieved from <http://www.biomedcentral.com/1472-6963/14/309> Health Research Council of New Zealand. (2019). Maori Health Advancement Guidelines. Retrieved from <https://www.hrc.govt.nz/sites/default/files/2021-02/HRC%20Maori%20Health%20Advancement%20Guidelines.pdf> MOH. (2002). Toward Clinical Excellence. An introduction to clinical audit, peer review and other clinical practice improvement activities. Retrieved from https://www.health.govt.nz/system/files/documents/publications/moh_tce_2002.pdf MOH. Equipment and modifications for disabled people. Retrieved from <https://www.health.govt.nz/your-health/services-and-support/disability-services/types-disability-support/equipment-and-modifications-disabled-people>
- 2) <https://www.health.govt.nz/your-health/services-and-support/disability-services/types-disability-support/equipment-and-modifications-disabled-people>
- 3) Paki, T. (2015). Whanaungatanga. Retrieved from <http://blog.core-ed.org/blog/2015/07/whanaungatanga.html>

- 4) [Statistics New Zealand](https://www.stats.govt.nz/topics/population-estimates-and-projections?gclid=EAlalQobChMIh5r9qsvv7wIVUxOrCh1GMw-KEAAYASAAEgIRevD_BwE). (2020). Population estimates and projections. Retrieved from https://www.stats.govt.nz/topics/population-estimates-and-projections?gclid=EAlalQobChMIh5r9qsvv7wIVUxOrCh1GMw-KEAAYASAAEgIRevD_BwE

Presenter biography

Maria Whitcombe-Shingler is an occupational therapist, who works at the Mobility Solutions Complex Wheelchair and Seating Service in the Auckland Region. Her main role is currently as an educator and mentor for therapists new to the service. She completed her Masters researching adult users' experiences and perspectives of using multifunction power wheelchairs in Aotearoa, New Zealand.

P4: “We can do it together” Co-adaptation of the Wheelchair Skills Training Program for children

Beatrice Ouellet^{1,2}, Dr Paula Rushton^{3,4}, Dr Marie-Eve Lamontagne^{1,2}, Dr Krista Best²

¹Laval University, Quebec, Canada. ²Centre for Interdisciplinary Research in Rehabilitation and Social Integration, Quebec, Canada. ³Montreal University, Montreal, Canada. ⁴CHU Ste-Justine Research Center, Montreal, Canada

Beatrice Ouellet, Occupational therapist and PhD student

Dr Paula Rushton, Associate professor

Dr Marie-Eve Lamontagne, Associate professor

Dr Krista Best, Assistant professor

Learning objectives

After attending the presentation, participants will be able to:

1. Identify 3 obstacles limiting the provision of pediatric wheelchair training services.
2. Identify 5 children and parents' needs regarding wheelchair training.
3. Describe 6 essential components that a wheelchair training intervention should include to respond the needs of children and their family.

Abstract

Introduction. Independent wheelchair mobility represents more than moving through spaces for children with physical disabilities. It facilitates exploration and interaction with the environment, thus fostering global development and social participation. However, wheelchair use is a complex activity that requires training for safe and effective mobility. An evidence-based Wheelchair Skills Training Program (WSTP) has been used effectively by rehabilitation clinicians to train adults, but there are limited pediatric-specific guidelines. Preliminary evaluations of the WSTP with children suggested that modifications are needed to increase adherence and effectiveness. The aim of this study is to co-adapt the WSTP for children ages 5 to 12 years (WSTP-Ped). **Method.** Using nominal group techniques, nine online meetings were conducted with an international committee of experts in wheelchair training. Consensus for modifications to the WSTP for children was obtained. Interviews with 5 parent-child dyads were conducted to identify families' needs and preferences for wheelchair training. **Preliminary results.** Pediatric training should focus on occupational goals and structured play-based approaches. Parents should be active partners of the training team. A developmental progression of wheelchair skills acquisition can help rehabilitation clinicians define a suitable customized practice schedule depending on age, expected level of independence, and goals. Certain skills of the WSTP should be adapted to pediatric wheelchair components and physical characteristics of younger children (e.g. picks objects from floor). Tips and tricks for teaching wheelchair skills to children should be added to the WSTP manual. **Conclusion.** This project will result in integration of pediatric considerations in the WSTP manual, and creation of a pediatric specific manual, derived in partnership with its intended users (ie., children, clinicians and parents). The WSTP manual will be available to pediatric rehabilitation clinicians as an easy-to-use resource for wheelchair mobility training. The next step is to conduct a randomized control trial to evaluate effectiveness.

Content references

- 1) Keeler, L., Kirby, R. L., Parker, K., McLean, K. D., & Hayden, J. A. (2019). Effectiveness of the wheelchair skills training program: A systematic review and meta-analysis. *Disability and Rehabilitation: Assistive Technology, 14*(4), 391–409.
<https://doi.org/10.1080/17483107.2018.1456566>
- 2) McMillan, S. S., King, M., & Tully, M. P. (2016). How to use the nominal group and delphi techniques. *International Journal of Clinical Pharmacy, (20160205)*.
<https://doi.org/10.1007/s11096-016-0257-x>
- 3) Sawatzky, B., Rushton, P. W., Denison, I., & McDonald, R. (2012). Wheelchair skills training programme for children: A pilot study. *Australian Occupational Therapy Journal, 59*(1), 2–9.
<https://doi.org/10.1111/j.1440-1630.2011.00964.x>

Presenter biography

Beatrice Ouellet is an occupational therapist with experience working in pediatrics. She completed a master's degree in public health and is now a doctoral student in clinical and biomedical sciences (option rehabilitation) at Laval University (Quebec, Quebec, Canada). Her project aims to co-develop and evaluate a wheelchair training program for children that is based on the Wheelchair Skills Program. She is a member of the Wheelchair Skills Program pediatric sub-committee. She is supervised by Krista Best, PhD and Marie-Eve Lamontagne, OT PhD.

P5: Wheelchair Skill Development for a Therapy Team

Miss Amy Hughes, Ms Ulrike Luebcke, Miss Brylee Lyons, Mrs Michelle Smith, Mrs Meg Whitelaw

ADHB, Auckland, New Zealand

Miss Amy Hughes, Kaiwhakaora Ngangahau

Ms Ulrike Luebcke, Kaiwhakaora Ngangahau

Miss Brylee Lyons, Kaiwhakaora Ngangahau

Mrs Michelle Smith, PT

Mrs Meg Whitelaw, Kaiwhakaora Ngangahau

Learning objectives

Following this poster session, participants will:

1. Learn about the journey of wheelchair skill development amongst a team of therapists measured by a pre and post survey.
2. View the resources developed to facilitate provision of wheelchair setup and skills training.

Abstract

From identifying learning needs to skill competency, the journey of service improvement can take time. This poster demonstrates our Ready to Roll wheelchair skill development for therapists within the Mobility Solutions service.

As clinicians working with complex clients, we recognised the need to up skill our team to achieve more effective wheelchair training outcomes. Our goal was to ensure that there is consistency in our practice through having standardised processes and skill level within our team.

Utilising the initial training and experience from Debbie Wilson and the Seating to Go service and drawing on the Wheelchair Skills Programme (Kirby et al.2018) we embarked on a service improvement journey. We completed a pre wheelchair skills training confidence survey across the team which identified the need for skill development, standard practice procedures and equipment to facilitate safe and effective training. Understanding our client population and improving on client outcomes has guided us in this project.

We then completed a post wheelchair skills training confidence survey across the team with excellent results and helpful feedback for ongoing training. Through measuring baseline confidence and setting specific goals we have been able to increase the awareness, skill and confidence level of the therapy team. These outcomes are expected to support clients to become more effective wheelchair users.

This poster aims to share the resources developed throughout this mahi work which could be of benefit to other service providers thereby weaving people together, whiria te tangata.

Content references

- 1) Best, K.I., Routhier, F., & Miller, W.C. (2014). A description of manual wheelchair skills training: current practices in Canadian rehabilitation centres. Retrieved from <https://doi.org/10.3109/17483107.2014.907367>
- 2) Keller, L. et al. (2018). Effectiveness of the Wheelchair Skills Training Program: a systematic review and meta-analysis. Retrieved from <https://doi.org/10.1080/17483107.2018.1456566>
- 3) Kirby RL, et al. (2019). Wheelchair Skills Program Manual Version 5.1 Dalhousie University, Halifax, Nova Scotia, Canada. Retrieved from <https://wheelchairskillsprogram.ca/wp-content/uploads/WSP-Manual-version-5.0-approved-version.3.pdf>
- 4) Kirby RL, et al. (2019). Effectiveness of a Wheelchair Skills Training Program for Powered Wheelchair Users: A Randomized Controlled Trial. Retrieved from <https://doi.org/10.1016/j.apmr.2015.07.009>
- 5) Tu, J. et al. (2017). Effectiveness and safety of wheelchair skills training program in improving the wheelchair skills capacity: a systematic review. Retrieved from <https://doi.org/10.1177/0269215517712043>

Presenter biography

TBA

P6: Monitoring Wheelchair Tyre Pressure as part of wheelchair user education

Mr Bill Contoyannie^{1,2}, Ms Angela Rowe^{1,2}, Ms Kim Vien¹

¹Melbourne Health, Melbourne, Australia. ²Monash Health, Melbourne, Australia

Mr Bill Contoyannie, Rehabilitation Engineer

Ms Angela Rowe, Physiotherapist

Ms Kim Vien, Occupational Therapist

Learning objectives

1. To understand the importance of maintaining tire pressure and its impact on wheelchair use
2. To evaluate the effectiveness of tyre pressure education for young adults.
3. To learn strategies around supporting someone with their wheelchair maintenance

Abstract

Young adult wheelchair users seen by the specialised wheelchair and seating clinics at both Monash and Melbourne health have goals relating to optimising the use and performance of their wheelchairs by reducing the effort to push or propel the wheelchair. Research has established that performance efficiency in wheelchair use is directly related to wheelchair tyre pressures more than the wheelchair mass (De Groot S, Vegter RJ, Van der Woude LH - 2013).

The wheelchair tyre pressure was recorded for every client when attending the clinics with a view to establishing both the level that wheelchair tyres are maintained to, as well as part of an introduction for the clients to the performance of their wheelchairs.

Data collected over a number of years indicated that there were discrepancies between left and right wheelchair tyres as well as lower tyre pressure compared to the relevant ideal pressure to which the wheelchair tyres should have been set. During clinic visits the tyre pressures were set correctly and education was delivered to the client to optimise the performance and use of their wheelchair. In subsequent clinic visits, tyre pressure measures demonstrated similar lower tyre pressures indicating little to no change in behaviors to maintain optimum tyre pressures. The data is analysed and presented to show the general setting of tyre pressure of the wheelchairs at these clinics including the same client/wheelchair on return visits.

As clinicians, we need to consider the barriers to maintaining optimum tyre pressure including poor access to a tyre compressor, need for physical or cognitive support, and lack of education on the importance of maintaining optimum tyre pressure. Further research would be beneficial to understand these barriers and establish more effective strategies to maintain tyre pressure and optimising the use and performance of wheelchairs

Content references

- 1) Sawatzky BJ, Denison I. *Wheeling efficiency: the effects of varying tyre pressure with children and adolescents*. *Pediatr Rehabil*. 2006 Apr-Jun;9(2):122-6. doi: 10.1080/13638490500126707. PMID: 16449070.

- 2) De Groot S, Vegter RJ, Van der Woude LH. *Effect of wheelchair mass, tire type and tire pressure on physical strain and wheelchair propulsion technique*. Med Eng Phys. 2013 Oct;35(10):1476-82. doi: 10.1016/j.medengphy.2013.03.019. Epub 2013 May 2. PMID: 23642660.
- 3) Booka M, Yoneda I, Hashizume T, Lee H, Oku H, Fujisawa S. *Effect of Tire Pressure to Physical Workload at Operating a Manual Wheelchair*. Stud Health Technol Inform. 2015;217:929-34. PMID: 26294587

Presenter biography

Bill Contoyannis is a qualified rehabilitation Engineer with a degree in Mechanical engineering and a Masters of Biomedical Engineering and is an adviser to health departments, professional organisations, and support associations throughout Australia. He currently works within the specialised seating teams at Melbourne Health and Monash Health.

He has been involved in a broad range of rehabilitation and assistive technology areas and has contributed to the field area of assistive technology for over thirty years and with a range of activities including incident investigation, education, research, advice, and clinical support. As part of this work he conducted formal training courses worldwide in patient safety, failures of assistive technology devices and litigation avoidance, and material science relating to the fabrication of artificial limbs, orthopaedic devices, wheelchairs, and other assistive technology. Further, Bill has conducted research in both the development and assessment of assistive technology.

Angela Rowe is a physiotherapist with over 20 years of experience, predominantly in the fields of neurology and disability. She has completed post-graduate studies in the field of Postural Management and worked as a Postural Management therapist at The Royal Hospital for Neuro-disability in London. Since returning to Melbourne, Angela has worked in two Wheelchair and Seating Services at The Royal Melbourne Hospital and Monash Health. Angela has co-authored a Wheelchair organisational standard at Monash Health and been involved in various research projects and conference presentations with her Wheelchair and Seating clinic team. She has a particular passion for upskilling other therapists and has led training workshops and provided mentorship. Angela also has her own business Postural Innovations which provides bed positioning assessments, wheelchair consultations and a product range of postural supports for 24 hour positioning.

Kim Vien is a Senior Occupational Therapist working in the disability sector specialising in the area of seating and equipment prescription. Having been in the disability sector for over 10 years, Kim has presented on the topic of seating at the 2017 & 2019 Oceania Seating Symposiums and at multiple ATSA daily living expos. Kim graduated in 2005 from the University of South Australia and completed honors in health sciences. With further studies in access consulting, she has expanded her skills to understand the built environments and how consumers and their technologies can interact more effectively. She has worked in both hospital and community settings and is now focused on improving services for adults with disabilities and their assistive technology needs.

P7: Blind spot sensor systems for power-wheelchairs

Alice Pellichero^{1,2}, PhD Krista Best^{1,2}, PhD François Routhier^{1,2}, PhD Pooja Viswanathan³, PhD William Miller⁴

¹Université Laval, Québec, Canada. ²Center for Interdisciplinary Research in Rehabilitation and Social Integration (Cirris), Québec, Canada. ³CEO, Braze Mobility Inc., Toronto, Canada. ⁴University of British Columbia, Vancouver, Canada
Alice Pellichero, PhD Candidate

Learning objectives

At the end of this presentation, participants will be able to:

1. recognize the interest of obstacle detection technology to safe PWC driving
2. determine which PWC users can use a blind spot sensor system in daily life
3. identify individuals needs related to obstacle detection technology

Abstract

Introduction. Blind spot sensor systems can improve power-wheelchair (PWC) safety.

Objectives. Compare accuracy of rear obstacle detection in a PWC with and without a sensor system; explore cognitive task load and perceived usability, safety, confidence and awareness; 3) explore PWC users' perceptions in real-world settings.

Methods. A mixed-method design was used. PWC users were provided the sensor system. In laboratory setting, accuracy and time of obstacles detection were notified. Twenty-two randomized conditions were completed with and without the sensor system. Cognitive task-load (*NASA-Task Load Index*), perceived usability (*Usability Metric for User Experience-LITE*) and safety, confidence and awareness (Likert-scale) were evaluated. Participants then used the sensor system at home for two-months before completing semi-structured interviews. Statistical (descriptive, t-tests) and thematic analysis were conducted.

Results. Among 11 PWC users (age=67.5±7.5y), obstacles were detected more accurately ($p<0.001$) and rapidly ($p<0.001$) with sensor system than without. Using the sensor system required lower cognitive task-load ($p=0.005$) and was perceived as easy to use. No improvements in safety, confidence or awareness were perceived. Four participants reported continued use after 2 months. Those who discontinued use reported lack of usefulness and technical issues. Three themes emerged: perceived usefulness (improved performance and confidence), barriers to use (technical issues and charge), and recommendations (personalization and design improvements).

Conclusions. Sensor systems may improve rear obstacle detection accuracy and time while reducing cognitive task load. However, technical and service improvements have to be made. Users' characteristics, environments and occupations play an important role in using obstacle detection technology.

Content references

- 1) Heerink M, Kröse B, Evers V, Wielinga B. (2010) Assessing Acceptance of Assistive Social Agent Technology by Older Adults: the Almere Model. *Int J of Soc Robotics* ;2:361–75. <https://doi.org/10.1007/s12369-010-0068-5>.
- 2) Rushton PW, Mortenson BW, Viswanathan P, Wang RH, Miller WC, Hurd Clarke L, et al. (2017) Intelligent power wheelchair use in long-term care: potential users' experiences and perceptions. *Disability and Rehabilitation: Assistive Technology* ;12:740–6. <https://doi.org/10.1080/17483107.2016.1260653>.
- 3) Viswanathan P, Zambalde EP, Foley G, Graham JL, Wang RH, Adhikari B, et al. (2017) Intelligent wheelchair control strategies for older adults with cognitive impairment: user attitudes, needs, and preferences. *Auton Robot* ;41:539–54. <https://doi.org/10.1007/s10514-016-9568-y>.

Presenter biography

Alice Pellichero is an occupational therapist. At the beginning of her career she worked in France in rehabilitation centers in neurology services with adults. She is currently conducting a clinical research project as part of the doctoral program in clinical and biomedical sciences at Université Laval (Québec City, Canada). She is attached to the Interdisciplinary Research Center for Rehabilitation and Social Integration (CIRRS) and is under the direction of Dr. François Routhier (CIRRS), Dr. Krista Best (CIRRS) and Dr. Eric Sorita (Bordeaux University). The aim of her research project is to enhance powered mobility device provision through better assessment and training. Realization of this research will lead to the development of a novel PWC driving program that may improve access to PWC mobility for individuals who may have otherwise been excluded. In turn, successful PWC mobility could improve participation and quality of life for the individuals.

P8: Getting in Trouble Together: Use of Assistive Technology to Facilitate Toddler Participation

Rachel Maher

Permobil New Zealand, Auckland, New Zealand

Clinical Education Specialist

Learning objectives

Participants will:

1. Review what participation looks like for typically developing toddlers
2. Hear three case examples of how use of assistive technology has facilitated participation in non-typically developing children
3. Hear feedback from parents about how assistive technology has facilitated participation for their child in family life

Abstract

Toddlers are busy little humans, with research suggesting they are frequently on the move, engaged in play or interacting with the world around them. The therapeutic benefits of early mobility for young people with mobility challenges have been well documented in the research, however the impact on how this mobility impacts on how toddlers participate in family life has not been documented to the same extent.

The Explorer Mini was launched in 2020, with early trials offering delightful stories of toddlers being typical toddlers. These are toddlers who had significant mobility challenges and require assistive technology to obtain age-appropriate mobility, who now have a device that allows them to explore their home, venture to the park with their family, chase the cat and interact with their older siblings, adventures that are familiar to many of us with typically developing children.

As part of the early Explorer Mini trials, feedback has been received from parents who have highlighted what assistive technology has meant to them as a family. An emerging theme of this feedback is how the device has created a shift away from their child being dependent on others, to having periods of being independent and an active participant in family life, becoming the busy little human we know toddlers to be.

In this session we review the impact of assistive devices on how young people participate in their world, including from the perspective of a parent who has experienced firsthand the positive impact assistive technology can have for young people.

Content references

- 1) Feldner, H.A., Logan, S.W. & Galloway, J.C. (2018) Mobility in pictures: a participatory photovoice narrative study exploring power mobility provision for children and families. Disability and Rehabilitation: Assistive Technology. DOI: 10.1080/17483107.2018.1447606

- 2) Kenyon, L.K., Mortenson W.B. & Miller, W.C. (2018). 'Power in Mobility': parent and therapist perspectives of the experiences of children learning to use powered mobility. *Developmental Medicine and Child Neurology*. DOI: 10.1111/dmcn.13906
- 3) Livingston, R. & Field, D. (2015) The child and family experience of power mobility: a qualitative synthesis. *Developmental Medicine and Child Neurology*. DOI: 10.1111/dmcn.12633

Presenter biography

Rachel Maher graduated from the University of Otago in 2003 with a Bachelor of Physiotherapy, and later gained her Post Graduate Diploma in Physiotherapy (Neurorehabilitation) in 2010.

After graduating, Rachel gained experience in inpatient rehabilitation and community Physiotherapy, before moving into a Child Development Service, working with children aged 0 to 16 years.

Rachel developed a passion for seating and mobility while working with children, recognising the value of a team approach to wheelchair and seating provision to achieve the best outcomes for end users.

Rachel later moved into a Wheelchair and Seating Outreach Advisor role at Enable New Zealand in 2014, complementing her clinical knowledge with experience in New Zealand Ministry of Health funding processes.

Rachel joined Permobil in June 2020, and is passionate about education and working collaboratively to achieve the best result for our end users.

P9: Evaluating clinical outcomes of modular wheelchair seating solutions in Muscular Dystrophy: a case study

Miss Bridget Churchill

Life for Living Ltd, Dover, United Kingdom. Spex Ltd, Christchurch, New Zealand
Occupational Therapist & Clinical Educator

Learning objectives

1. Identify 3 outcome measures that are relevant for adults with Muscular Dystrophy.
2. Name 5 reasons why seated mobility may be abandoned or under-utilised.
3. Name 4 factors that can influence physical and emotional comfort for wheelchair users

Abstract

A single case study will be presented about a wheelchair user with Muscular Dystrophy over a 2 year period and during the COVID-19 pandemic in the UK. In collaboration with the therapist team, it will highlight the importance of matching person and technology and a person-centred approach.

Body shape distortions are avoidable (Robertson et al., 2016), however progressive neurological conditions can lead to challenges that the wheelchair seating systems and services need to respond to effectively. The value of informed decision-making is evident when optimising postural presentation can be perceived as functionally restrictive or not aligned with wheelchair users' goals or wellbeing – matching the person with technology requires an understanding of these factors (Scherer, Craddock & Mackeogh, 2011) to facilitate the 'bigger picture' for community inclusion.

Selection of the seating system requires a shared perspective to ensure goals relating to comfort, function and posture converge within wheelchair provision for the wheelchair user and prescribing clinician. Wheelchair seating reviews ideally should be in anticipation rather than in response to deterioration (Richardson et al., 2009). There is added risk of assistive technology abandonment due to progression of health limitations and 'negative factors' (Ravneberg, 2012) if the wheelchair seating system is unable to respond to these changes and service providers unable to plan for anticipate changes.

The impact of Spex modular seating technology was evaluated from initial introduction (transition from existing specialist system) and to present date, taking into considering the impact of the COVID pandemic and additional challenges with 24-hour postural care. Evaluations included visual analogue pain scale, mood assessments, photographs, interviews, Goal Attainment Scale (GAS) and physical measurements.

The decision to use a modular seating system was based on personal choice and will be shown to be appropriate in responding to functional and postural changes to optimise posture, comfort and function.

Content references

- 1) Ravneberg, B. (2012). Usability and abandonment of assistive technology. *Journal of Assistive Technologies*, 6(4), 259–269. <https://doi.org/10.1108/17549451211285753>

- 2) Richardson, Marion & Frank, Andrew. (2009). Electric powered wheelchairs for those with muscular dystrophy: Problems of posture, pain and deformity. *Disability and rehabilitation. Assistive technology*. 4. 181-8. [10.1080/17483100802543114](https://doi.org/10.1080/17483100802543114).
- 3) Robertson, J., Baines, S., Emerson, E., & Hatton, C. (2018). Postural care for people with intellectual disabilities and severely impaired motor function: A scoping review. *Journal of Applied Research in Intellectual Disabilities*, 31(S1), 11–28. <https://doi.org/10.1111/jar.12325>
- 4) Scherer, M. J., Craddock, G., & Mackeogh, T. (2011). The relationship of personal factors and subjective well-being to the use of assistive technology devices. *Disability and rehabilitation*, 33(10), 811–817. <https://doi.org/10.3109/09638288.2010.511418>

Presenter biography

Bridget Churchill has over 20 years experience with working with adults and older adults with neurological difficulties and additional diagnoses. She has extensive experience in physical rehabilitation and postural care for neurological and adult/elderly populations. Bridget believes that life is for living to the fullest and works with clients to ensure that their goals are the focus and that independence and skills are improved, supporting individuals to problem-solve barriers to their chosen level of participation.

P10: Meeting Changing Seating Needs Post Hip surgery

Tracee-lee Maginnity

Permobil, Sydney, Australia,
Clinical Education Specialist

Learning objectives

1. Attendees will be able to articulate at least one post surgical positioning requirement
2. Attendees will be able to identify at least 2 points of control that were changed within this case example
3. By end of session identify at least two reasons why hip surgery is recommended

Abstract

Hip surgery is a common procedure encountered within the pediatric population. Hip surveillance studies, 24 hour postural management evidence and orthopedic intervention provides guidance and protocols around prevention and post-surgical positioning. In NSW the hospital will attempt to re configure the existing mobility base and seating to meet discharge requirements or lend equipment from a limited loan pool, but it often falls to the community OT to access alternative equipment to meet the required temporary seating and mobility needs.

This case study follows a young NSW boys' experiences with mobility and seating adjustments through hip and spinal surgical intervention and beyond. We will look at how adjustable modular seating can be configured to meet changing needs, some of the barriers encountered along the way from access to equipment, the funding process and crucial seated position reconfigurations. In an ideal world how would we do things differently? The perspective of the family, client and primary prescribing therapists will be shared during the session.

Content references

- 1) Soft-tissue release for spastic hip subluxation in cerebral palsy Miller F Cardoso Dias R Dabney KW Lipton GE Triana M. Paediatric Orthopaedic. 1997 Sep-Oct;17(5):571-84
- 2) Adductor surgery to prevent hip displacement in children with cerebral palsy: the predictive role of the Gross Motor Function Classification System. Shore BJ, Yu X, Desai S, Selber P, Wolfe R, Graham HK. J Bone Joint Surg Am. 2012 Feb 15;94(4):326-34. doi: 10.2106/JBJS.J.02003.
- 3) Effects of different seating equipment on postural control and upper extremity function in children with cerebral palsy Dilek Sahinoğlu 1, Gürsoy Coskun 1, Nilgün Bek 1 Prosthet Orthot Int. 2017 Feb;41(1):85-94
- 4) Physical risk factors influencing wheeled mobility in children with cerebral palsy: a cross-sectional study Elisabet Rodby-Bousquet 1 2, Ginny Paleg 3, Jackie Casey 4, Alicja Wizert 5, Roslyn Livingstone. BMC Pediatr. 2016 Oct 10;16(1):165
- 5) Prevention of hip displacement in children with cerebral palsy: a systematic review. Miller SD, Juricic M, Hesketh K, Mclean L, Magnuson S, Gasior S, Schaeffer E, O'donnell M, Mulpuri K. Dev Med Child Neurol. 2017 Nov;59(11):1130-1138.
- 6) Spine deformities in patients with cerebral palsy; the role of the pelvis. Hasler C, Brunner R, Grundshtein A, Ovadia D. J Child Orthop. 2020 Feb 1;14(1):9-16.

- 7) Association between pelvic obliquity and scoliosis, hip displacement and asymmetric hip abduction in children with cerebral palsy: a cross-sectional registry study. Hägglund G. BMC Musculoskelet Disord. 2020 Jul 14;21(1):464.
- 8) Severe hip displacement reduces health-related quality of life in children with cerebral palsy. Ramstad K, Jahnsen RB, Terjesen T. Acta Orthop. 2017 Apr;88(2):205-210

Presenter biography

Tracee-lee Maginnity joined Permobil Australia in July 2019, as a clinical education specialist. Originally from New Zealand, she graduated Auckland University of Technology with a BSc (Occupational Therapy) in 2003 and has since worked in various roles related to seating and mobility including assessing, prescribing and educating. After gaining experience as an assessor and prescriber at Seating To Go / Wheelchair Solutions in prescribing for both disability and injury, she moved to Australia in 2011 to take on the Senior Occupational Therapist role in a custom moulded seating service. She then worked in clinical consulting and education roles until joining Permobil. Tracee-lee is passionate about maximising functional outcomes with end users and the importance of education within the industry. She has mentored many therapists interested in AT. Her experience includes working with complex postures to achieve custom outcomes.

P11: Use of Virtual Boundaries to Facilitate Safer Community Access: A Case Study of Customisation

Mrs Sandra Malkin, Mr Richard Sutton

EMHS, Perth, Australia

Mrs Sandra Malkin, Occupational Therapist

Mr Richard Sutton, Technician

Learning objectives

1. Consider areas in which Geofencing may improve a client's safe and independent community access
2. Outline ways that the safety of community access/involvement may be improved despite reduced supervision resources
3. Demonstrate an understanding of low cost solutions to complex individual client requirements.
4. Have a working knowledge of elements to consider when designing or purchasing similar systems or augmentations.

Abstract

Miss C is a long term powered wheel chair user of over fifty years. She remains fiercely independent, continuing to enjoy exploring her immediate and wider environment and dislikes being contained or supervised by support workers.

The Rehabilitation Technology Unit was approached by the Occupational Therapist working at her care facility who expressed concern about her tendency to wander un-supervised, often becoming lost or stranded. Along with the obvious issues, she was also placing herself and others in danger by crossing nearby busy roads with little regard to traffic.

Using a concept called Geofencing, the Rehabilitation Technology Unit was able to set up two virtual GPS monitored perimeters- A hard and a soft boundary. The area within the soft boundary was the safe zone where Miss C was free to roam as she pleased. The area between the hard and soft boundaries acted as a warning buffer and the area outside the hard boundary was a no go zone where the chair was automatically disabled.

In addition to the chair being disabled, as Miss C attempted to travel outside of the 'warning zone' staff were notified via SMS. The notification SMS included a map showing the chair's location in the event that she needed 'rescuing' or the chair needed reactivating. Prior to crossing the "hard boundary" and leaving the safe zone, Miss C was warned that she was approaching a hard boundary, with an audible warning saying that she needed to return to the safe zone and the chairs functionality was greatly reduced

Using an innovative and individualised participant centred approach, this system has enabled Miss C to continue to connect with her local community, given her added independence, and improved the safety of herself and others.

Content references

- 1) Neven, A., Vanrompay, Y., Declercq, K., Janssens, D., Wets, G., Dekelver, J., Daems, J., & Bellermand, T. (2017) Viamigo: Monitoring tool to support independent travel by persons with intellectual disabilities. *Journal of the Transportation Research Board* 2650 (1) 25-32.
Doi: [10.3141/2650-04](https://doi.org/10.3141/2650-04)
- 2) Schaathun, H., Molnes, S., Berg, H., & Alnes, R. (2014) Electronic Tracking of Users with Cognitive Impairment: Contrasting a Literature Review with Local Experience. In E. Jaatun, E. Brooks, K. Berntsen, and M Jaatun (eds) *Proceedings of the 2nd European Workshop on Practical Aspects of Health Informatics*. Trondheim, Norway. retrieved from <http://ceur-ws.org>
- 3) Târnaucă, B., Puiu, D., Nechifor, S., & Comnac, V. (2013). Using Complex Event Processing for implementing a Geofencing service. *IEEE 11th International Symposium on Intelligent Systems and Informatics (SISY)*, Subotica, Serbia, pp. 391-396, doi: 10.1109/SISY.2013.6662608.

Presenter biography

Sandy Malkin completed her Occupational Therapist degree at Curtin University in Perth, Australia. She has worked predominantly in Perth in a variety of settings, but also spent several years working and travelling in the United Kingdom and the United States of America.

Her primary focus has been in the area of adult rehabilitation, particularly working with clients with spinal cord injury. She is currently working at the State Rehabilitation Service in Perth within the Rehabilitation Technology Unit. She specialises in complex seating within powered wheelchairs, and embracing current and emerging technology to enable individuals with significant disability to operate their powered wheelchair via alternate control systems.

Richard Sutton has spent his working life accumulating transferable skills and knowledge from various trades and professions. He has worked and or gained qualifications in fields as diverse as automotive mechanics, Data/communications networking, Environmental science and Shotfiring (explosives) to name but a few.

He is currently in a technical role supporting occupational therapists at the state rehabilitation service of Western Australia. He uses his broad and unique skill set to find solutions to the complex needs of individuals with a difference and thrives on the challenges this presents